Claim Set as Amended

1. (Currently Amended) An error correction encoding method conducted in a digital data writing apparatus when recording data to a storage medium, comprising the steps of:

arranging said sequential input digital data so as to form a plurality of data blocks of a predetermined matrix form, said plurality of data blocks being formed sequentially;

appending outer parity of a predetermined size and inner parity of a predetermined size to each column and row of each of said plurality of data blocks, respectively, thereby forming one ECC (Error Correction Code) block to perform an error correction on the basis of the one ECC block;

reordering rows including outer parity so as to insert said rows including outer parity separately into the other rows including no outer parity for each of said plurality of encoded data blocks in said appending step; and

writing rows in the same order in said plurality of data blocks re-arranged in said reordering step to the storage medium sequentially on a row-by-row basis.

2. (Currently Amended) [[A]] The method according to claim 1, wherein in said arranging step, each of said plurality of data blocks is formed by using the following equations:

i=b/X and

j=b-(X×i),

where i and j ($0 \le I \le (Y-1)$ and $0 \le j \le (X-1)$) represent row and column positions in each data block of (X×Y)-byte size, respectively,

where b ($0 \le b \le (X \times Y) - 1$) represents an order in which the bytes in said sequential input data of (X×Y)-byte size are inputted, and

where X and Y are integers greater than 1.

3. (Currently Amended) [[A]] The method according to claim 2, wherein X is 172 and Y is 192.

4. (Currently Amended) [[A]] The method according to claim 3, wherein said outer parity is 16-bytes long and said inner parity is 10-bytes long.

5. (Currently Amended) [[A]] The method according to claim 1, wherein said appending step comprises of the sub-steps of:

appending said outer parity of a predetermined size to each column of each of said plurality of data blocks in the column direction; and

appending said inner parity of a predetermined size to each row of each of said plurality of data blocks outer-parity-encoded in said outer parity appending step in the row direction.

6. (Currently Amended) [[A]] The method according to claim 1, wherein in said writing step, said plurality of data blocks ~~consist of~~ include N (N≥2) data blocks, each being (J×K)- bytes in size, and a byte at (R(i), C(i)) of the i-th data block is selected and written to said storage medium based on the following equations:

S=R(i)×(J×N)+C(i)+J×(i-1), where (R(i), C(i)) (0 ≤ R(i) ≤ (K-1) and 0 ≤ C(i) ≤ (J-1)) represents row and column positions in the i-th data block, and s (0 ≤ S ≤ (J×K×N)-1) represents an order in which bytes in all data blocks sequentially are written to said storage medium.

7. (Currently Amended) [[A]] The method according to claim 6, wherein J is 182 and K is 208.

8. (New) An error correction encoding method for a storage medium, comprising the steps of:

arranging a sequential input digital data so as to form a pair of data blocks of a predetermined matrix form, said pair of data blocks being formed sequentially, wherein in said arranging step, each of said pair of data blocks is formed by using the following equations:

i=b/X and

$j=b-(X\times i)$,

where i and j ($0 \le I \le (Y-1)$ and $0 \le j \le (X-1)$) represent row and column positions in each data block of (X×Y)-byte size, respectively,

where b ($0 \le b \le (X\times Y)-1$) represents an order in which the bytes in said sequential input data of (X×Y)-byte size are inputted, and

where X and Y are integers greater than 1; and

appending an outer parity of a predetermined size and an inner parity of a predetermined size to each column and row of each of said plurality of data blocks, respectively, thereby forming one ECC (Error Correction Code) block to perform an error correction on the basis of the one ECC block.

9. (New) The method of claim 8, further comprising:

interleaving rows including outer parity separately into the other rows including no outer parity for each of said pair of encoded data blocks in said appending step.

10. (New) The method of claim 9, further comprising:

writing rows in the same order in said pair of data blocks re-arranged in said interleaving step to the storage medium sequentially on a row-by-row basis.

11. (New) The method of claim 8, wherein X is 172 and Y is 192.

12. (New) The method of claim 11, wherein said outer parity is 16-bytes long and said inner parity is 10-bytes long.

13. (New) The method of claim 8, wherein said appending step comprises of the sub-steps of:

appending said outer parity of a predetermined size to each column of each of said pair of data blocks in the column direction; and

appending said inner parity of a predetermined size to each row of each of said pair of data blocks outer-parity-encoded in said outer parity appending step in the row direction.

14. (New) An error correction encoding method, comprising the steps of:

arranging a sequential input digital data so as to form a pair of data blocks of a predetermined matrix form, said pair of data blocks being formed sequentially and each data block having a size of 172×192 bytes;

appending an outer parity of a predetermined size and an inner parity of a predetermined size to each column and row of each data block, respectively; and

combining each data block in where the outer parity and the inner parity are appended, thereby forming one ECC (Error Correction Code) block to perform an error correction on the basis of the one ECC block.

15. (New) The method of claim 14, further comprising:

re-ordering rows including outer parity so as to interleave said rows including outer parity separately into the other rows including no outer parity for each data block in said combining step.

16. (New) The method of claim 15, further comprising:

modulating the data in a predetermined modulation algorithm; and

writing the modulated data of rows in the same order in said pair of data blocks re-arranged in said reordering step to a storage medium sequentially on a row-by-row basis.

17. (New) The method of claim 16, wherein the writing step includes a step of appending a predetermined sync code, and then performing the writing step.

18. (New) The method of claim 17, wherein the predetermined sync codes of four columns are appended within the re-arranged one ECC block before the writing step.

19. (New) The method of claim 14, wherein said outer parity is 16 bytes and said inner parity is 10 bytes.

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20. (New) The method of claim 19, wherein one ECC block consists of 364×208 bytes.